

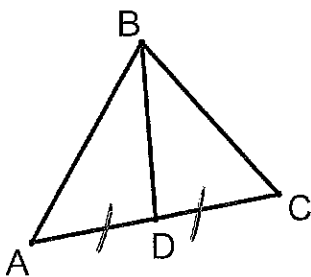
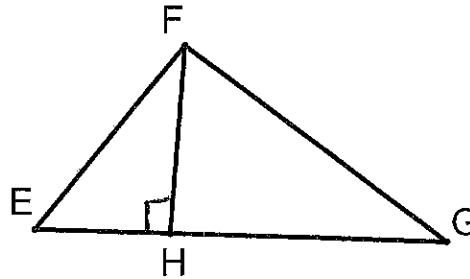
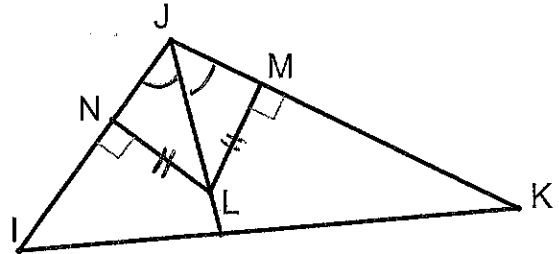
Name Key

Date \_\_\_\_\_

## 202 Review 5.1

1. Orthocenter What center is formed by the 3 altitudes of a triangle?
2. Centroid What center is formed by the 3 medians of a triangle?
3. Circumcenter What center is formed by the 3 perpendicular bisectors of the sides of a triangle?
4. Incenter What center is formed by the 3 angle bisectors of a triangle?

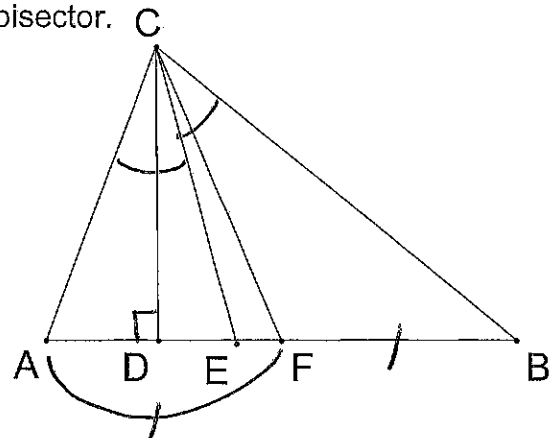
Mark the following pictures with what you know to be true based on the given information. (either right angles or congruent segments or angles)

5.  $\overline{BD}$  is a median of  $\triangle ABC$ .6.  $\overline{FH}$  is an altitude of  $\triangle EFG$ 7.  $\overline{JL}$  bisects  $\angle IJK$ .

Use the following diagram for #s 8-10.

Given:  $\overline{AB} \perp \overline{CD}$ ,  $\angle ACE \cong \angle BCE$ , and  $\overline{AF} \cong \overline{BF}$ . Identify each segment as median, altitude, angle bisector, or perpendicular bisector.

8. Angle bisector  $\overline{CE}$
9. Median  $\overline{CF}$
10. Altitude  $\overline{CD}$



11. G is the incenter.

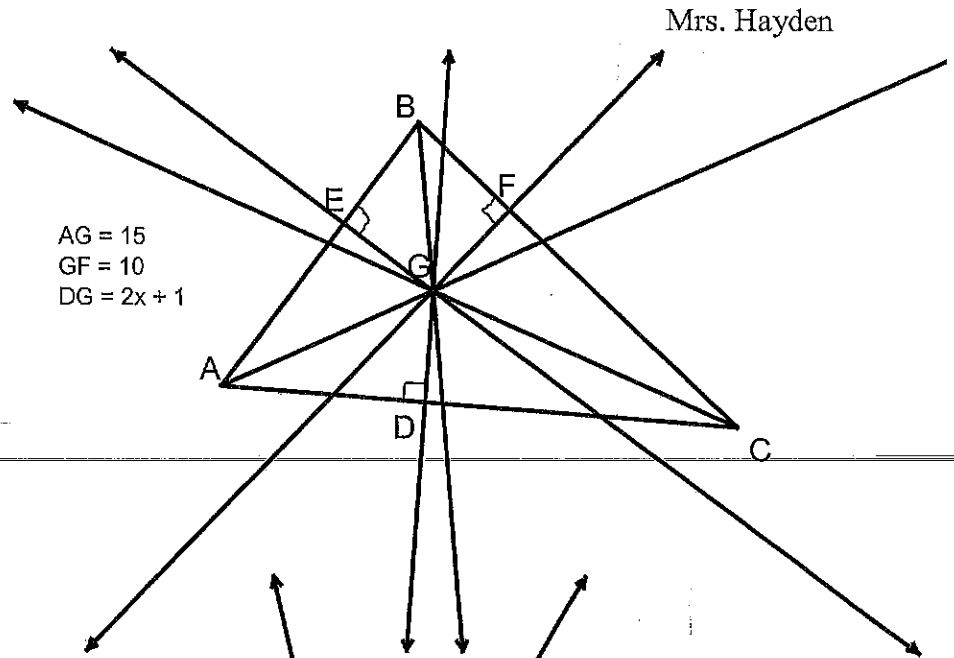
$$x = \underline{4.5}$$

$$GF = GD = GE$$

$$10 = 2x + 1$$

$$9 = 2x$$

$$4.5 = x$$



12. G is the circumcenter.

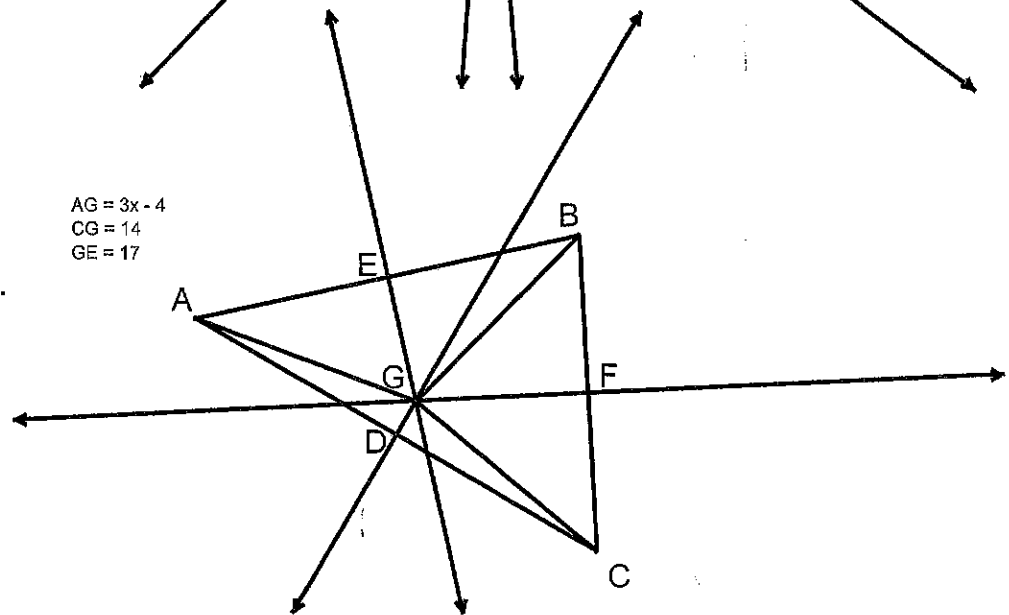
$$x = \underline{6}$$

$$AG = CG = BG$$

$$3x - 4 = 14$$

$$3x = 18$$

$$x = 6$$



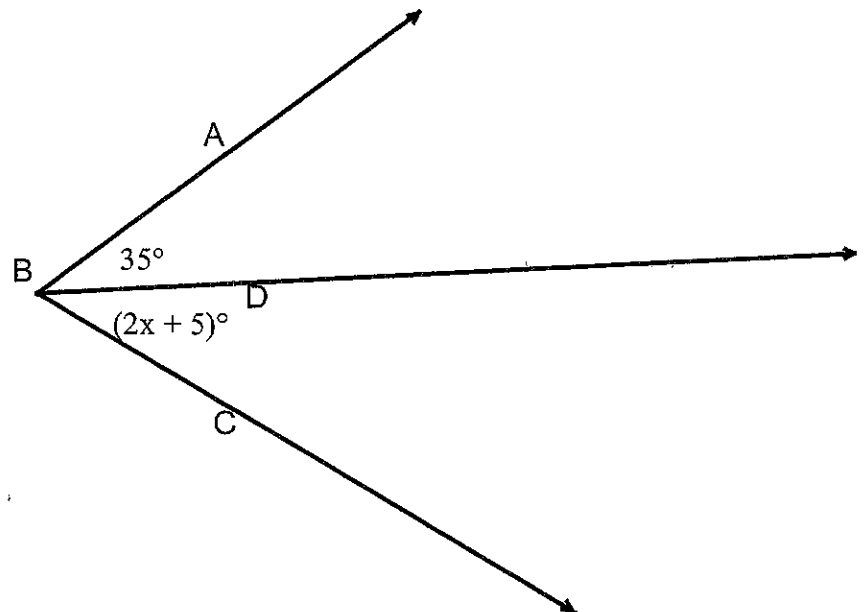
13. BD is an angle bisector.

$$x = \underline{15}$$

$$2x + 5 = 35$$

$$2x = 30$$

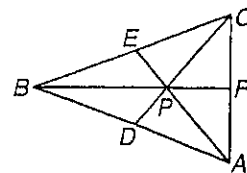
$$x = 15$$



# 5-1 Practice

## Bisectors, Medians, and Altitudes

**ALGEBRA** In  $\triangle ABC$ ,  $\overline{BF}$  is the angle bisector of  $\angle ABC$ ,  $\overline{AE}$ ,  $\overline{BF}$ , and  $\overline{CD}$  are medians, and  $P$  is the centroid.



4.5 1. Find  $x$  if  $DP = 4x - 3$  and  $CP = 30$ .  $DP = \frac{1}{2}CP$   $4x - 3 = \frac{1}{2}30$

$$4x - 3 = 15$$

$$4x = 18$$

36 2. Find  $y$  if  $AP = y$  and  $EP = 18$ .  $EP = \frac{1}{2}AP$

$$18 = \frac{1}{2}y \rightarrow y = 36$$

2.2 3. Find  $z$  if  $FP = 5z + 10$  and  $BP = 42$ .  $FP = \frac{1}{2}BP$   $5z + 10 = \frac{1}{2}42 \rightarrow 5z + 10 = 21 \rightarrow 5z = 11 \rightarrow z = 2.2$

~~4. If  $m\angle ABC = x$  and  $m\angle BAC = m\angle BCA = 2x - 10$ , is  $\overline{BF}$  an altitude? Explain.~~

4 4. Find  $x$  if  $AE = 27$  and  $AP = 4x + 2$

$$AP = \frac{2}{3}AE$$

$$4x + 2 = \frac{2}{3}27$$

$$4x + 2 = 18$$

$$4x = 16$$

$$x = 4$$

**ALGEBRA** In  $\triangle PRS$ ,  $\overline{PT}$  is an altitude and  $\overline{PX}$  is a median.

5. Find  $RS$  if  $RX = x + 7$  and  $SX = 3x - 11$ .

$$RS = 32$$

$$x + 7 = 3x - 11$$

$$18 = 2x$$

$$x = 9$$

$$2(9 + 7) = RS$$

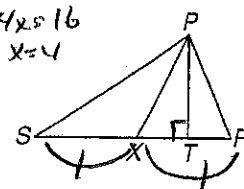
$$x = 9$$

6. Find  $RT$  if  $RT = x - 6$  and  $m\angle PTR = 8x - 6$ .  $\approx 90$

$$RT = 6$$

$$8x = 96$$

$$x = 12$$



**ALGEBRA** In  $\triangle DEF$ ,  $\overline{GI}$  is a perpendicular bisector.

3.5 7. Find  $x$  if  $EH = 16$  and  $FH = 6x - 5$ .  $= 16$

$$6x = 21$$

$$x = 3.5$$

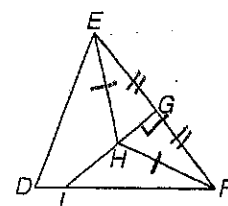
5 8. Find  $y$  if  $EG = 3.2y - 1$  and  $FG = 2y + 5$ .  $\approx 3.2y - 1$

$$6 = 1.2y$$

$$5 = y$$

7.5 9. Find  $z$  if  $m\angle EGH = 12z$ .  $\approx 90$

$$z = 7.5$$



**COORDINATE GEOMETRY** The vertices of  $\triangle STU$  are  $S(0, 1)$ ,  $T(4, 7)$ , and  $U(8, -3)$ . Find the coordinates of the points of concurrency of  $\triangle STU$ .

10. orthocenter

11. centroid

12. circumcenter

13. **MOBILES** Nabuko wants to construct a mobile out of flat triangles so that the surfaces of the triangles hang parallel to the floor when the mobile is suspended. How can Nabuko be certain that she hangs the triangles to achieve this effect?

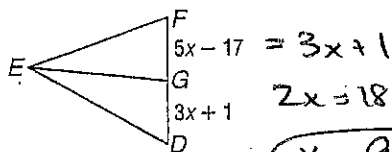
## 5-1

## Skills Practice

## Bisectors, Medians, and Altitudes

ALGEBRA For Exercises 1-4, use the given information to find each value.

1. Find
- $x$
- if
- $\overline{EG}$
- is a median of
- $\triangle DEF$
- .

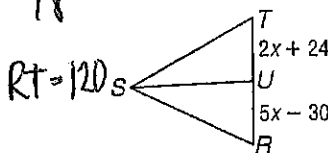


$$5x - 17 = 3x + 1$$

$$2x = 18$$

$$x = 9$$

2. Find
- $x$
- and
- $RT$
- if
- $\overline{SU}$
- is a median of
- $\triangle RST$
- .

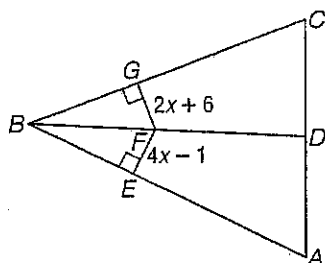


$$2x + 24 = 5x - 30$$

$$54 = 3x$$

$$18 = x$$

3. Find
- $x$
- and
- $EF$
- if
- $\overline{BD}$
- is an angle bisector. 4. Find
- $x$
- and
- $IJ$
- if
- $\overline{HK}$
- is an altitude of
- $\triangle HIJ$
- .



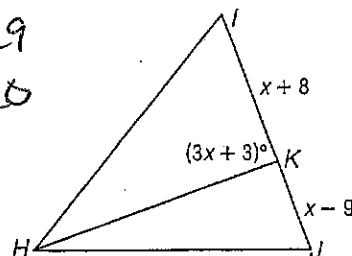
$$2x + 6 = 4x - 1$$

$$7 = 2x$$

$$3.5 = x$$

$$x = 29$$

$$15 = 20$$



$$3x + 3 = 90$$

$$3x = 87$$

$$x = 29$$

ALGEBRA For Exercises 5-7, use the following information.

In  $\triangle LMN$ ,  $P$ ,  $Q$ , and  $R$  are the midpoints of  $\overline{LM}$ ,  $\overline{MN}$ , and  $\overline{LN}$ , respectively.

5. Find
- $x$
- .

6. Find
- $y$
- .

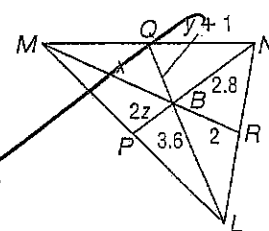
7. Find
- $z$
- .

$$BP = 2z$$

$$BL = 3.6$$

$$BR = 2$$

$$BN = 2.8$$

ALGEBRA Lines  $a$ ,  $b$ , and  $c$  are perpendicular bisectors of  $\triangle PQR$  and meet at  $A$ .

8. Find
- $x$
- .

$$8x + 16 = 24$$

9. Find
- $y$
- .

$$8x = 8$$

$$x = 1$$

10. Find
- $z$
- .

$$5y - 6 = 24$$

$$5y = 30 \quad y = 6$$

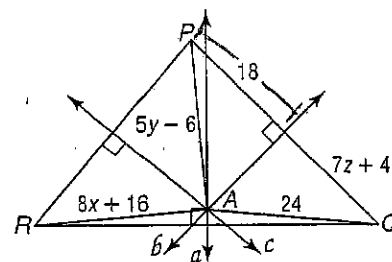
$$AR = 8x + 16$$

$$AP = 5y - 6$$

$$AQ = 24$$

$$7z + 4 = 18$$

$$7z = 14 \quad z = 2$$

COORDINATE GEOMETRY The vertices of  $\triangle HIJ$  are  $G(1, 0)$ ,  $H(6, 0)$ , and  $I(3, 6)$ . Find the coordinates of the points of concurrency of  $\triangle HIJ$ .

11. orthocenter

12. centroid

13. circumcenter